U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT **Assistant Secretary for Housing-Federal Housing Commissioner**	**Series and Series Number:**
TO: DIRECTORS, HOUSING DIVISION **DIRECTORS, MULTIFAMILY DIVISION** **DIRECTORS, SINGLE FAMILY DIVISION**	**MATERIALS RELEASE NO.** 1300
	ISSUE DATE: October 26, 1998
	REVIEW DATE: October 26, 2001

SUBJECT: **1. Product** CONTEC Autoclaved Aerated Concrete (AAC) Reinforced Building Elements

2. Name and Address of Manufacturer

CONTEC Mexicana, S.A.DE C.V.
Anillo Periferico No. 333
Col. San Jemo
Monterrey, N.L.
Mexico CP 64630

Texas CONTEC, Inc.
Subsidiary in the U.S.
12087 Starcrest
Blossom Business Center
San Antonio, TX 78237

Data on the nonstandard product, described herein have been reviewed by the Department of Housing and Urban Development (HUD) and determination has been made that it is considered suitable from a technical standpoint for the use indicated herein. This Release does not purport to establish a comparative quality or value rating for this product as compared to standard products normally used in the same manner.

This Materials Release cannot be used as an indication of endorsement, or approval by HUD of the described product, and any statement or representation, however made, indicating such approval or endorsement by HUD is unauthorized. See Code 18, U.S.C. 709.

Any reproduction of this Release must be in its entirety.

USE: Structural and nonstructural use of reinforced Autoclaved Aerated Concrete (AAC) elements for floors, roofs, curtain walls and partitions.

DESCRIPTION:

CONTEC AAC elements are composed of cement, lime, gypsum, quartz sand to which aluminum powder is added as an expanding agent to obtain a homogeneous cellular structure. Autoclaving (high pressure curing) is used to attain the final strength of the material. Nominal densities of the material range from 28 pcf (450 kg/m^3) to 44 pcf (700 kg/m^3) corresponding to a nominal compressive strength of 350 psi (25 kg/cm^2) and 710 psi (50 kg/cm^2) respectively. AAC is noncombustible and possesses fire resistance capabilities, acoustic isolation and thermal insulation properties.

Table - Properties of CONTEC AAC Reinforced Elements

Characteristics	GP3.3/0.6	GP4.4/0.7	Units
Maximum Density	37 (600)	44 (700)	pcf (kg/m^3)
Design Weight[1]	45 (715)	52 (840)	pcf (kg/m^3)
Compressive Strength	498 (35)	711 (50)	psi (kg/cm^2)
Masonry Compressive Strength (f'm)	---	---	psi (kg/cm^2)
Masonry Shear Strength (V)	---	---	psi (kg/cm^2)
Modulus of Elasticity	249000 (18,500)	356000 (25,000)	psi (kg/cm^2)
Shrinkage	0.00205 (.25)	0.00210 (.25)	in/ft (mm/m)
Thermal Expansion Coefficient	8 x 10^{-6}	8 x 10^{-6}	K^{-1}
Resistance of Freezing	0.979	0.979	---
Moisture Content (Average)	8	8	%

[1]Values consider material moisture content.

CONTEC AAC reinforced products consist of elements such as: lintels, staircase steps, wall panels and slab/and roof panels. Wall panels are used as curtain walls and slab/roof panels are used for floor construction.

APPLICATION OF EACH ELEMENT:

Lintels

CONTEC AAC lintels are used to span over doors and windows in AAC masonry construction. They are fabricated in GB4.4 density with lengths ranging from 3 feet 3 inches (100 cm) to 6 feet 6 inches (200 cm). Other lengths can be produced for special designs. Lintels available widths are 4 inches to 12 inches (10 cm to 30 cm).

Staircase Steps

CONTEC AAC staircase steps are reinforced elements manufactured in GB4.4 density. Staircase steps range from 4 feet 4 inches (110 cm) to 5 feet long (150 cm), 12 inches wide (30 cm) and 7 inches (17.5 cm) or 8 inches high (20 cm).

Wall Panels

CONTEC AAC wall panels are used for exterior walls (curtain walls) and partition walls of steel or reinforced concrete frames for industrial, commercial and residential buildings. They are produced with a tongue-and-groove profile in lengths up to 20 feet (600 cm) and from 2½ inches to 12 inches thick (6 cm to 30 cm). Panel width can be up to 2 feet (62.5 cm). Wall panels can also be used in partition walls.

Slab Panels

CONTEC AAC slab panels are used in construction of floor and roof slabs. Slab panels are fabricated in thickness ranging from 4 inches (10 cm) to 12 inches (30 cm) in 1 inch (2.5 cm) increments, and in lengths up to 20 feet (600 cm). Panel width can be up to 2 feet (62.5 cm).

Table - Dimensions for Wall Panels and Reinforced Floor and Roof Panels

Length	Up to 20 feet (609.5 cm)
Width	Up to 2 feet (62.4 cm)
Thickness	4, 5, 6, 7, 8, 10 and 12 inches (10, 12.5, 15, 17.5, 20, 25 and 30 cm)

Table - Dimensions for Lintel and Staircase Construction Units

Construction Unit	Thickness inches (cm)	Length inches (cm)	Width inches (cm)
Non-load Bearing Lintel	4, 5 (10.0, 12.5)	53 (135) 65 (165) 79 (200)	10 (25)
	4, 5 (10.0, 12.5)	53 (135) 65 (165) 79 (200)	12 (30)
25 cm Load Bearing Lintel	6, 7, 8, 10, 12 (15, 17.5, 20, 25, 30)	53 (135) 65 (165) 79 (200)	10 (25)
30 cm Load Bearing Lintel	6, 7, 8, 10, 12 (15, 17.5, 20, 25, 30)	53 (135) 65 (165) 79 (200)	12 (30)
Staircase	7, 8 (17.5, 20)	39 (100) 47 (120) 55 (140)	12 (30)

Connections

CONTEC AAC construction system employs connections and fixtures specially designed for AAC construction. For connection of load bearing and non-load bearing masonry walls, metal strip connectors are used. These connectors are hot dip galvanized to provide resistance against moisture. The galvanized coating shall comply with ASTM A153-95.

Connectors for non-load bearing wall panels, either vertical or horizontal, are also hot dip galvanized fixtures which are fabricated with ASTM A-86 steel. Fastening elements recommended for AAC construction are detailed in CONTEC Design Manual, dated April 1998.

ANALYSIS AND DESIGN:

All structures shall be analyzed and designed by a licensed professional engineer. Masonry units shall be designed in accordance with ACI 530 and ACI 530.1, except as otherwise noted in this Materials Release (MR). Reinforced elements shall be designed based on elastic theory of design following procedures established by RILEM committees 78-MCA and 51-ALC and complying with strength and serviceability requirements of ACI 523.2R/96 "Guide for Precast Cellular Concrete Reinforced Units" and ACI 318-95 Appendix A, except as otherwise noted in this MR. Precast products shall be reinforced with corrosion-protected steel when reinforcement is required. Tables for maximum load for AAC reinforced elements are included in Section 3 of the Design CONTEC Manual, dated April 1998. Allowable design stresses are presented in the following table:

Table - Allowable Design Values for ACC Reinforced Elements

Property	GB3.3/0.6	GB4.4/0.7	Units
Flexure, extreme fiber stress in compression, f_c	179 (12.60)	256 (18.00)	psi (kg/cm^2)
Shear stress, with no web reinforcement, v_c	12 (.84)	17 (1.20)	psi (kg/cm^2)
Bearing stress, f_b	119 (8.40)	170 (12.00)	psi (kg/cm^2)
Modulus of Elasticity	249 (17,519)	356 (25,047)	ksi (kg/cm^2)
Reinforcing steel, f_s	24 (1689)	24 (1689)	ksi (kg/cm^2)

INSTALLATION:

Installation shall be in accordance with Section 5 of the CONTEC Design Manual, dated April 1998 and the following provisions:

For installation of CONTEC AAC reinforced elements, it is recommended to observe the instructions provided by the plant, the material lists and the installation drawing.

Elements must be handled with care when moving or storing them. Interim storage is not recommended, packages of CONTEC elements should be transported directly to the construction site. Elements can be laid on any kind of weather. After installation, the elements must be protected from heavy rain. Salt shall not be used to melt snow or ice over the elements.

Care should be taken that the underlying masonry provides an even support for the CONTEC panels. Cement mortar or CONTEC blocks are recommended to be used to provide an even support. If underlying masonry is even, additional mortar bed is not necessary.

CONTEC floor panels are delivered lying horizontally. In subsequent order they are lifted by a crane and placed in their final position. Care should be taken that the first panel is properly aligned in order to avoid later adjustments. After the panels are placed, reinforcement is placed in the joints with the ring tie reinforcement as required in the detail drawing. Subsequently, concrete is poured in the joints and ring beams are properly compacted.

FIRE RESISTANCE:

CONTEC AAC reinforced elements have been tested under ASTM E119 (UL/ANSI 263 NFPA 251) with the exception of the staircase step elements. Fire ratings are summarized in the following table:

Table - CONTEC AAC Fire Ratings

Elements	Fire Ratings (Hours)	UL Design Numbers (UL Fire Resistance Director 1998)
Reinforced Wall Panels.	4	U920
Roof and Slab Panels 4 inch thick.	0.5, 1	K909, P932
Roof and Slab Panels 6 inch to 12 inch thick.	0.5, 1, 1.5, 2, 3, 4	K909, P932
Lintels 6 inch thick.	4	U919

ACOUSTIC PERFORMANCE:

Acoustic performance requires analysis and design by an acoustic specialist. Additional information concerning acoustic design is available in Section 2.1.9 of the CONTEC Design Manual, dated April 1998.

THERMAL PERFORMANCE:

Information regarding performance is available in Section 2.1.10.1 of the CONTEC Design Manual, dated April 1998.

IDENTIFICATION AND LABELING:

CONTEC Mexicana shall certify that CONTEC AAC block units conform to the requirements stated in this Materials Release (MR). Underwriters Laboratories (UL) and Factory Mutual Research Company (FMRC) shall validate the manufacturer's certification that CONTEC AAC reinforced elements meet the requirements of this MR. CONTEC Mexicana shall implement quality control checks as determined by HUD. Validation records of UL and FMRC inspections shall be made available for examination by HUD upon request.

Each element certified as conforming to this MR shall bear the label of the manufacturer, and the HUD MR No. 1300.

INSPECTION:

HUD Field Office personnel will make site inspections to ensure compliance with the special structural system covered by this MR. A copy of the field inspection report shall be sent to HUD Headquarters, Office of Consumer and Regulatory Affairs, Manufactured Housing and Standards Division, when there is evidence of noncompliance with any portion of this MR or if the system does not appear to give satisfactory performance.

CERTIFICATION AND WARRANTY:

The complete wall system covered by this MR shall be built by a company (the "Contractor") whose personnel have been trained by CONTEC Mexicana. CONTEC Mexicana shall furnish the Contractor with a certificate which states that the Contractor is qualified to perform the work under this MR. Installation of the complete wall system shall be in accordance with Section 5 of the CONTEC Design Manual dated April 1998 and this MR, and shall be the responsibility of the Contractor. For a period of four (4) years from the date of

date of initial occupancy, the manufacturer shall warrant to the owner that the special structural building system covered by this MR shall be free of defects which materially affect the structural integrity and weather resistance of the constructed property. A copy of the warranty shall be given to the owner.

The liability of the manufacturer under this warranty shall be limited to replacement of defective materials and the cost of installation; or at the option of the manufacturer, payment in lieu thereof.

The manufacturer shall not be liable for damage resulting from fire or natural catastrophes such as floods, tornadoes or the failure of the soil to support the foundation. This warranty shall be in lieu of all other warrants, expressed or implied. The manufacturer shall not be liable for incidental or consequential damages such as lost rents or profits.

The manufacturer's warranty does not relieve the builder, in any way, of responsibility under the terms of the Builder's Warranty required by the National Housing Act or under any provisions applicable to any other housing program. A copy of the warranty shall be furnished by the builder to the owner upon completion of the property.

MANUFACTURER'S RESPONSIBILITIES:

Issuance of this MR commits the manufacturer to fulfill, as a minimum, the following:

1. Produce, label and certify the material, product or system in strict accordance with the terms of this MR.

2. Provide necessary corrective action in a timely manner for all cases of justified complaint, poor performance or failure reported by HUD.

3. When requested, provide the Office of Consumer and Regulatory Affairs, Manufactured Housing and Standards Division, HUD Headquarters, with a representative list of properties, in which the material, product or system has been used, including complete addresses or descriptions of locations and dates of installation.

4. Inform HUD in advance of changes in production facilities, methods, design of the product, company name, ownership or mailing address.

EVALUATION:

This MR shall be valid for a period of three years from the date of initial issuance or most recent renewal or revision, whichever is later. The holder of this MR shall apply for renewal or revision 90 days prior to the Review Date printed on this MR. Submittals for renewal or revision shall be sent to HUD Headquarters. Appropriate User Fee shall be sent to:

U.S. Department of Housing and Urban Development
Technical Suitability of Products Fees
P.O. Box 954199
St. Louis, MO 63195-4199

The holder of this MR may apply for revision at any time prior to the Review Date. Minor revisions may be in the form of a supplement to the MR.

If the Department determines that a proposed renewal or supplement constitutes a revision, the appropriate User Fee for a revision will need to be submitted in accordance with Code of Federal Regulations 24 CFR 200.934, "User Fee System for the Technical Suitability of Products Program," and current User Fee Schedule.

CANCELLATION:

Failure to apply for a renewal or revision shall constitute basis for cancellation of this MR. HUD will notify the manufacturer that the MR may be canceled when:

1) conditions under which the document was issued have changed so as to affect production of, or to compromise the integrity of the accepted material, product or system,

2) the manufacturer has changed its organizational form without notifying HUD, or

3) the manufacturer has not complied with responsibilities it assumed as a condition of HUD's acceptance.

However, before cancellation, HUD will give the manufacturer a written notice, of the specific reasons for cancellation, and the opportunity to present views on why the MR should not be canceled. No refund of fees will be made on a canceled document.